

Permit Fact Sheet

General Information

Permit Number:	WI-0020681-09-0	
Permittee Name:	VILLAGE OF OREGON	
Address: City/State/Zip:	117 Spring Street Oregon WI 53575	
Discharge Location:	SW ¼ of NE ¼ of Section 12, T5N, R9E – Lat: 42.92469° N / Lon: 89.37554° W	
Receiving Water:	Oregon Branch (Badfish Creek Watershed, LR07 – Lower Rock River Basin) in Dane County	
StreamFlow (Q _{7,10}):	0 cfs	
Stream Classification:	Limited Aquatic Life for approximately 1.1 miles; Limited Forage Fish for 6.7 miles then Fish and Aquatic Life Warmwater Community	
Design Flow(s)	Annual Average	1.8 MGD
Significant Industrial Loading?	None.	
Operator at Proper Grade?	Advanced facility with required subclasses: A1 – Suspended Growth Processes; B – Solids Separation; C – Biological Solids/Sludges; P – Total Phosphorus; and L – Laboratory. Multiple operators fully certified.	
Approved Pretreatment Program?	N/A	

Facility Description

The Village of Oregon operates a wastewater treatment facility (WWTF) serving a population of approximately 9,500 with no significant industry. Treatment consists of an activated sludge treatment system with grit removal and automated fine screens as preliminary treatment. The activated sludge process is designed to remove phosphorus biologically as well as BOD and suspended solids. Wastewater passes through four final clarifiers for final settling. Chemical phosphorus treatment backup is available primarily to treat side streams from sludge processing. Sludge is aerobically digested, thickened with a gravity belt thickener, and stored in a sludge storage tank during months when land spreading is not allowed by law or is impractical due to weather conditions or land availability. Biosolids are ultimately landspread on DNR approved agricultural fields. The plant treats approximately 1.32 MGD of wastewater per day with a design flow of 1.8 MGD. The collection system for the Village of Oregon is a separate sewer system with no constructed overflow points. The Village is also covered under a “no exposure certification” for storm water. The Department has found the facility to be in substantial compliance with their current WPDES permit.

In order to comply with the total phosphorus effluent limitations calculated based on s. NR 217.13, Wis. Adm. Code, and as set forth in the Rock River TMDL, Oregon will implement a Department-approved Adaptive Management Plan (Plan No. WQT-2017-0003) to pursue final phosphorus limit compliance. This effort will involve close partnerships with the Madison Metropolitan Sewerage District, Village of Oregon, City of Stoughton, WDNR Nevin Fish Hatchery, various Municipal Separate Storm Sewer Systems (MS4s) within the Yahara River watershed, County Land & Water Conservation Departments, NGOs, Lake Management Groups, and the agricultural community in an effort to reduce in-stream phosphorus concentration in the Yahara River watershed. Oregon’s current permit expiring on June 30, 2019 was revoked and will be reissued to include the provisions outlined in the adaptive management plan.

The attached water quality based effluent limits recommendations by the Water Quality Bureau for this permit reissuance dated September 26, 2017 contains additional information regarding this discharge to the Oregon Branch. The WQBEL memo also include an outfall location map depicting the location of the Oregon WWTP outfall.

Proposed Permit Reissuance

The Department anticipates an effective date of April 1, 2019 for the proposed permit. Therefore, to allow a full permit term of five years, the proposed permit's expiration date is March 31, 2024. If the permit reissuance process takes more or less time than anticipated, the permit's dates of effectiveness and expiration may be changed accordingly.

Sample Point Designation

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/sample Contents and Treatment Description (as applicable)
701	1.32 MGD (Avg. 9/1/2014 – 8/31/2017)	Influent: 24-Hr Flow Proportional composite samples collected prior to screening and grit removal.
001	Effluent Flow Monitoring Not Required	Effluent: 24-Hr Flow Proportional composite samples collected prior to step aerator and grab samples collected after step aerator prior to discharge to the Oregon Branch.
004	143 Dry US Tons (Avg. 2014 – 2016)	Aerobically digested, Thickened liquid, Class B. Representative sludge samples shall be collected after the gravity belt thickener.
107	N/A – Field Blank	In-Plant: Mercury field blank collected using standard sample handling procedures.

1 Influent - Proposed Monitoring

Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Continuous	Continuous	
BOD5, Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Mercury, Total Recoverable		ng/L	Quarterly	24-Hr Flow Prop Comp	See subsection 1.2.1.1 for Mercury Monitoring requirements.

Changes from Previous Permit & Explanation of Monitoring Requirements

No changes from previous permit. Standard influent monitoring parameters and frequencies for a Major municipal treatment facility of this size. Quarterly influent mercury monitoring is required per NR 106.145(3)(a)2, Wis. Adm. Code, for municipal WWTF's with actual flows greater than 1.0 MGD.

2 Inplant - Proposed Monitoring and Limitations

Sample Point Number: 107- GEN PLANT (Hg blank)

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Mercury, Total Recoverable		ng/L	Quarterly	Blank	See subsection 2.2.1.1 in permit for Mercury Monitoring requirements.

Changes from Previous Permit & Explanation of Monitoring Requirements

No changes from previous permit. A mercury field blank shall be collected using the Clean Hands/Dirty Hands sample collection procedure excerpted from EPA Method 1669 for every day that mercury influent and effluent samples are collected.

3 Surface Water - Proposed Monitoring and Limitations

Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD5, Total	Monthly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Weekly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	20 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	348 lbs/day	3/Week	Calculated	Limit in effect January.
Suspended Solids, Total	Weekly Avg	430 lbs/day	3/Week	Calculated	Limit in effect February.
Suspended Solids, Total	Weekly Avg	414 lbs/day	3/Week	Calculated	Limit in effect March, May and July.
Suspended Solids,	Weekly Avg	428 lbs/day	3/Week	Calculated	Limit in effect April, June

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Total					and November.
Suspended Solids, Total	Weekly Avg	359 lbs/day	3/Week	Calculated	Limit in effect August.
Suspended Solids, Total	Weekly Avg	234 lbs/day	3/Week	Calculated	Limit in effect September.
Suspended Solids, Total	Weekly Avg	365 lbs/day	3/Week	Calculated	Limit in effect October.
Suspended Solids, Total	Weekly Avg	364 lbs/day	3/Week	Calculated	Limit in effect December.
Suspended Solids, Total	Monthly Avg	247 lbs/day	3/Week	Calculated	Limit in effect January.
Suspended Solids, Total	Monthly Avg	305 lbs/day	3/Week	Calculated	Limit in effect February.
Suspended Solids, Total	Monthly Avg	294 lbs/day	3/Week	Calculated	Limit in effect March, May and July.
Suspended Solids, Total	Monthly Avg	303 lbs/day	3/Week	Calculated	Limit in effect April, June and November.
Suspended Solids, Total	Monthly Avg	255 lbs/day	3/Week	Calculated	Limit in effect August.
Suspended Solids, Total	Monthly Avg	166 lbs/day	3/Week	Calculated	Limit in effect September.
Suspended Solids, Total	Monthly Avg	259 lbs/day	3/Week	Calculated	Limit in effect October.
Suspended Solids, Total	Monthly Avg	258 lbs/day	3/Week	Calculated	Limit in effect December.
Nitrogen, Ammonia (NH3-N) Total	Daily Max	10 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect October through May.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	6.2 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect April and May.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	6.3 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect June through September.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect October through March.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.6 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect April through September.
Nitrogen, Ammonia	Monthly Avg	10 mg/L	3/Week	24-Hr Flow	Limit in effect October

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
(NH3-N) Total				Prop Comp	through March.
Dissolved Oxygen	Daily Min	4.0 mg/L	3/Week	Grab	
pH Field	Daily Max	9.0 su	3/Week	Grab	
pH Field	Daily Min	6.0 su	3/Week	Grab	
Phosphorus, Total	Monthly Avg	1.0 mg/L	3/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	6-Month Avg	0.6 mg/L	3/Week	24-Hr Flow Prop Comp	This is an Adaptive Management (AM) interim limit that goes into effect beginning November 1, 2021. See subsection 5.1 for the AM interim limit compliance schedule and subsection 3.2.1.2 in permit for averaging periods and compliance determination.
Phosphorus, Total		lbs/day	3/Week	Calculated	Calculate the daily mass discharge of phosphorus in lbs/day on the same days phosphorus sampling occurs.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See subsection 3.2.1.7 in permit for Whole Effluent Toxicity (WET) testing dates and WET requirements.
Chronic WET	Monthly Avg	3.0 TUC	See Listed Qtr(s)	24-Hr Flow Prop Comp	See subsection 3.2.1.7 in permit for Whole Effluent Toxicity (WET) testing dates and WET requirements.
Mercury, Total Recoverable		ng/L	Quarterly	Grab	Monitoring Only. See subsection 3.2.1.8 in permit for Mercury Monitoring requirements.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring Only - January 1, 2022 through December 31, 2022.
Temperature Maximum		deg F	3/Week	Continuous	Monitoring Only - January 1, 2022 through December 31, 2022. See subsection

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					3.2.1.9 for Temperature Monitoring requirements.
Nitrogen, Total Kjeldahl		mg/L	Quarterly	24-Hr Flow Prop Comp	Monitoring Only
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	24-Hr Flow Prop Comp	Monitoring Only
Nitrogen, Total		mg/L	Quarterly	Calculated	Monitoring Only

Changes from Previous Permit

A daily maximum ammonia nitrogen limit of 10 mg/L will now apply for October through May replacing the 25 mg/L limit that applied for the same time period. Weekly average ammonia nitrogen limits of 6.2 mg/L will apply for April and May and 10 mg/L for October through March, which replace the limit of 6.4 mg/L that applied for May through October. Monthly average ammonia nitrogen limits of 2.6 mg/L for April through September and 10 mg/L for October through March are now required replacing limits of 14 mg/L for November through April and 2.7 mg/L for May through October. Total phosphorus (TP) mass limits calculated for the Rock River TMDL along with TP concentration limits of 0.075 mg/L as a 6-month average and 0.225 mg/L as a monthly average calculated under s. NR 217.13, Wis. Adm. Code, are recommended; however, Oregon has requested and the Department has approved a plan to implement a watershed adaptive management approach under s. NR 217.18, Wis. Adm. Code, as a means for Oregon to achieve compliance with the phosphorus water quality standards in s. NR 102.06, Wis. Adm. Code. This adaptive management plan is a partnership between the Madison Metropolitan Sewerage District, City of Stoughton, Village of Oregon and the Wisconsin DNR Nevin Fish Hatchery plus various municipal separate storm sewer system (MS4s) within the Yahara River action area as defined in the adaptive management plan. A 1.0 mg/L monthly average TP limit will apply on the permit effective date and an adaptive management TP interim limit of 0.6 mg/L as a 6-month average will apply beginning November 2020. Oregon currently has an alternative phosphorus limit of 1.1 mg/L as a monthly average. Mercury effluent data from Oregon's current permit term show that the 30-day Upper 99th Percentile (1.05 ng/L) is now below the monthly average limit of 1.3 ng/L based on wildlife criterion so a mercury variance is no longer required. Annual acute and annual chronic whole effluent toxicity testing is again required with new time frames for testing. A chronic WET limit of 3.0 TUc will also apply.

Explanation of Limits and Monitoring Requirements

Refer to the WQBEL memo for the detailed calculations, prepared by Jacob Zimmerman dated September 26, 2017 used for this reissuance.

Note: Throughout the remainder of this fact sheet all citations of administrative code, such as s. NR 217.13, Wis. Adm. Code, above, shall be referenced as s. NR 217.13, and reflect current Wisconsin Administrative Code.

Categorical Limits

BOD₅, Total Suspended Solids (TSS) Dissolved Oxygen (DO) and pH

No changes are recommended in the permit limitations for BOD₅, Total Suspended Solids (concentration and TMDL mass), DO or pH. Because the reference effluent flow rates and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.

Water Quality Based Limits and WET Requirements and Disinfection

Disinfection – Disinfection of the effluent is not required as this discharge is to a variance stream (Limited Aquatic Life).

Ammonia Nitrogen – Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Tables 2C and 4B of ch. NR 105. Subchapter III of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for ammonia.

Phosphorus – Phosphorus requirements are based on the Phosphorus Rules that became effective December 1, 2010 as detailed in chs. NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus. See <http://dnr.wi.gov/topic/surfacewater/phosphorus.html> for details regarding the administrative rules for phosphorus discharges.

As noted below, total phosphorus mass limits based on the Rock River Total Maximum Daily Load (TMDL) Waste Load Allocation (WLA) along with s. NR 217.13, concentration limits of 0.075 mg/L as a 6-month average and 0.225 mg/L as a monthly average have been determined necessary for Oregon. However, Oregon has requested and the Department has approved a plan to implement a watershed adaptive management approach under s. NR 217.18, as a means for Oregon to achieve compliance with the phosphorus water quality standard in s. NR 102.06, and the Rock River TMDL. The phosphorus limitations and conditions in the proposed permit reflect the approved adaptive management (AM) plan No. WQT-2017-0003. AM Plan No. WQT-2017-0003 is a partnership between the City of Stoughton, Village of Oregon, WDNR Nevin Fish Hatchery, Madison Metropolitan Sewage District and various Municipal Separate Storm Sewer Systems (MS4s) located in the Yahara River watershed. The AM Plan identifies the Yahara River action area, which encompasses the entire Yahara River watershed, where watershed projects shall be implemented to reduce phosphorus and total suspended solids loadings from point and non-point sources of these pollutants.

At the end of the first permit, the total minimum phosphorus reduction required is 5,329 lbs/yr. Oregon's portion of the total reduction is 610 lbs/yr.

The Adaptive Management Plan was written such that the Madison Metropolitan Sewerage District (MMSD) is solely responsible for coordinating in-stream monitoring and submittal of all required data and annual reports for all entities that are participating in the Yahara River Basin AM Plan; this includes the City of Stoughton, Village of Oregon, WDNR Nevin Fish Hatchery, and various MS4 partners. Each entity has signed an Intergovernmental Agreement (IGA) indicating more details on roles and responsibilities. This IGA as well as the Memorandum of Understanding (MOU) that the Department signed with MMSD can be found in the appendix of the Adaptive Management Plan.

Total phosphorus mass limits were calculated to comply with the Rock River TMDL, and were derived consistent with the assumptions and requirements of the EPA-approved waste load allocation for the Rock River. Limits were determined using the code changes and the provision of the TMDL. The final TMDL mass limits are presented in the following table:

Total Phosphorus Effluent Limitations

Month	Monthly Avg. (lbs./day)
Jan	2.18
Feb	2.43
March	2.11
April	2.16
May	2.04
June	2.20
July	2.02
Aug	1.95
Sept	1.95
Oct	1.99
Nov	2.17
Dec	2.16

Whole Effluent Toxicity – Whole effluent toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised August 2016. (See the current version of

the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at <http://dnr.wi.gov/topic/wastewater/wet.html>). Oregon is required to perform annual acute and annual chronic WET testing according to the testing schedule at subsection 3.2.1.7 of the permit. According to the requirements specified in s. NR 106.08, a chronic WET limit of 3.0 TUC is also required.

Mercury – Requirements for mercury are included in s. NR 106.145 Wis. Adm. Code. (See <http://dnr.wi.gov/topic/Mercury/>). Based on mercury effluent and field blank data collected during the current permit term the 30-day Upper 99th Percentile is 1.05 ng/L, which is less than the wildlife criterion of 1.3 ng/L (the most stringent limit for this substance) so a mercury limit is unnecessary. The existing Mercury Pollutant Minimization Program plan should continue to be implemented.

Chloride – Acute and chronic chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 of ch. NR 105. Subchapter IV of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for chloride. The calculated 1-day Upper 99th Percentile (338.50 mg/L) of Oregon's reported chloride effluent concentrations is less than the acute (daily maximum) chloride limit (757 mg/L) and the 4-day Upper 99th Percentile (306.00 mg/L) is less than the chronic (weekly average) chloride limit (395 mg/L), so chloride limits are not needed in the permit (WQBEL). Monthly chloride monitoring is required in calendar year 2022 to collect data for the next permit reissuance process.

Thermal – Requirements for Temperature are included in NR 102 Subchapter II Water Quality Standards for Temperature and NR 106 Subchapter V Effluent Limitations for Temperature. Oregon discharges to a limited aquatic life stream and the thermal rules specify a daily maximum effluent temperature limitation of 86° F. Based on discharge temperature data from January 2012 through December 2013 the maximum daily effluent temperature reported was 73° F, therefore, no reasonable potential for exceeding the daily maximum limit exists and no limits are recommended. Temperature monitoring is required in 2022 to provide data for the next permit reissuance.

Total Nitrogen Monitoring (NO₂+NO₃, TKN and Total N) – Based on the “Guidance for Total Nitrogen Monitoring in WPDES Permits” dated October 2012, quarterly effluent monitoring for Total Nitrogen is required for municipal major facilities discharging to the Mississippi River Basin.

4 Land Application - Proposed Monitoring and Limitations

Municipal Sludge Description						
Sample Point	Sludge Class (A or B)	Sludge Type (Liquid or Cake)	Pathogen Reduction Method	Vector Attraction Method	Reuse Option	Amount Reused/Disposed (Dry Tons/Year)
004	B	Liquid	Fecal Coliform	Injection	Land Application	143 dry US tons
Does sludge management demonstrate compliance? Yes						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No						
If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility						
Is a priority pollutant scan required? No – Design flow is 1.8 MGD.						
Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

Sample Point Number: 004- SLUDGE

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Jan 1, 2020 - Dec 31, 2020
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Jan 1, 2020 - Dec 31, 2020
Solids, Total		Percent	Annual	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH ₄ -N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	

Changes from Previous Permit:

New time-frame for PCB testing is calendar year 2019

Explanation of Limits and Monitoring Requirements

Requirements for land application of municipal sludge are determined in accordance with ch. NR 204. Ceiling and high quality limits for metals in sludge are specified in s. NR 204.07(5). Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7) for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k).

5 Compliance Schedules

5.1 Adaptive Management Interim Limit Compliance Update

Required Action	Due Date
Progress Report #1: Submit the first progress report on the ability of the wastewater treatment facility to consistently meet the Adaptive Management interim effluent limit of 0.6 mg/L as a 6-month seasonal average with averaging periods of May through October and November through April.	11/30/2019
Progress Report #2: Submit the second progress report on the ability of the wastewater treatment facility to consistently meet the Adaptive Management interim effluent limit of 0.6 mg/L as a 6-month seasonal average with averaging periods of May through October and November through April.	11/30/2020
Comply with Adaptive Management Interim Limit: The Adaptive Management interim effluent limit of 0.6 mg/L as a six-month average goes into effect. The averaging periods are May through October and November through April. Compliance with the 6-month average limit is evaluated at the end of each 6-month period on April 30 and October 31 annually.	11/01/2021

Explanation of Compliance Schedule

This compliance schedule requires Oregon to provide progress reports on compliance with the adaptive management interim limit of 0.6 mg/L as a 6-month average and then comply with that limit beginning November 2020.

Special Reporting Requirements

The Village of Oregon in collaboration with Madison Metropolitan Sewerage District, City of Stoughton, and the WDNR Nevin Fish Hatchery have requested and the Department approved a plan to implement a watershed adaptive management approach. This proposed permit aligns the timeline of permit reissuance and expiration along with adaptive management compliance dates for these facilities.

Attachments:

Water Quality Based Effluent Limits (WQBEL) – September 26, 2017

WET Checklist Summary – September 26, 2017 WQBEL, Page 18

Map(s) – September 26, 2017 WQBEL, Page 21

Adaptive Management Request Form – January 25, 2017

Madison Metropolitan Sewerage District Adaptive Management Plan – January 2017

Madison Metropolitan Sewerage District Adaptive Management Plan Amendment – February 2018

Substantial Compliance Determination – March 8, 2017
Public Notice

Proposed Expiration Date:

March 31, 2024

Prepared By:

Phillip Spranger, Wastewater Specialist

Date: October 10, 2019

cc: Amy Garbe

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: September 26, 2017

FILE REF: 3200

TO: Phillip Spranger—SCR/Fitchburg

FROM: Adrian Stocks – WY/3

Adrian Stocks

SUBJECT: Water Quality-Based Effluent Limitations for the Village of Oregon Wastewater Treatment Facility WPDES Permit No. WI-0020681-08-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using Chapters NR 102, 104, 105, 106, 207, 210 and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Village of Oregon wastewater treatment facility in Dane County. This municipal wastewater treatment facility (WWTF) discharges to the Oregon Branch, located in the Badfish Creek Watershed in the Lower Rock River Basin. This discharge is included in the Rock River TMDL as approved by the USEPA. The evaluation of the permit recommendations is discussed in more detail in the attached report.

No changes are recommended in the permit limitations for BOD₅, Total Suspended Solids, pH, and Dissolved Oxygen. Based on our review, the following recommendations are made on a chemical-specific basis:

Outfall 001

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
BOD ₅			30 mg/L	20 mg/L		
TSS			30 mg/L	20 mg/L		1
pH	9.0 s.u.	6.0 s.u.				
Dissolved Oxygen		4.0 mg/L				
Ammonia Nitrogen						
April-May	10 mg/L		6.2 mg/L	2.6 mg/L		2
June-September			6.3 mg/L	2.6 mg/L		
October-March	10 mg/L		10 mg/L	10 mg/L		
Phosphorus						1
s. NR 217.13				0.225 mg/L	0.075 mg/L	3
Adaptive Management				1.0 mg/L	0.6 mg/L	4
Temperature						5
Chloride						5
Mercury						6

Footnotes:

- Additional phosphorus and TSS mass limitations in attachment #1 are required in accordance with the wasteload allocations specified in the Rock River TMDL
 - Monthly average Total Phosphorus mass limits are required as listed in the table on page 2.
 - Monthly and weekly average TSS mass limits are required as listed in the table on page 2.
- Additional limits needed to comply with s. NR 106.07 (3), Wis. Adm. Code Expression of Limits are in **BOLD**.
- The final WQBEL for phosphorus based on s. NR 217.13, Wis. Adm. Code is 0.225 mg/L as a monthly average and 0.075 mg/L as a six-month average. Oregon is currently in the process of

evaluating adaptive management as the option to achieve compliance with this limit. Along with the TMDL mass limits, interim limits consistent with this approach as outlined in s. NR 217.18(3)(e), Wis. Adm. Code would be included in the permit in place of the final WQBEL. If the receiving water is not meeting the water quality criteria after two permit terms the final WQBEL based on s. NR 217.13, Wis. Adm. Code may be included in the permit.

4. A compliance schedule may be allowed for compliance with the 0.6 mg/L six-month average limit.
5. Monitoring in the fourth year of the permit term
6. Minimum of quarterly monitoring.

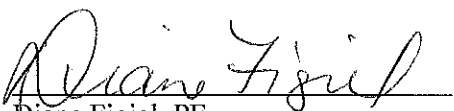
Along with the chemical-specific recommendations mentioned above, the need for acute and chronic whole effluent toxicity (WET) monitoring and limits has also been evaluated for the discharge from the Oregon WWTF. Following the guidance provided in the Department's November 1, 2016 *Whole Effluent Toxicity Program Guidance Document - Revision #11*, a chronic WET limit of 3.0 TUC as a monthly average annual is recommended. Annual acute and chronic WET testing is also recommended in the reissued permit. Tests should be done in rotating quarters, to collect seasonal information about this discharge. WET testing shall continue after the permit expiration date (until the permit is reissued).

Sampling WET concurrently with any chemical-specific toxic substances is recommended. Chronic testing shall be performed using a dilution series of 100%, 30%, 10%, 3% & 1%. The Instream Waste Concentration to assess chronic test results is 33%. The primary control and dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the Oregon Branch or laboratory water.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Jacob Zimmerman at (608) 275-3230 or Jacob.Zimmerman@wisconsin.gov.

Attachments (2) – Narrative & Map

PREPARED BY: Jacob Zimmerman
Water Resources Engineer

APPROVED BY:  date: 9/26/17
Diane Figiel, PE,
Water Resources Engineer

E-cc: Amy Garbe, P.E., Wastewater Engineer – SCR/Waukesha
Tim Ryan, P.E., Regional Wastewater Supervisor – SCR/Fitchburg
Kari Fleming, Biomonitoring Coordinator – WY/3

Water Quality-Based Effluent Limitations for The Village of Oregon

WPDES Permit No. WI-0020681-0

Prepared by: Jacob Zimmerman

PART 1 – BACKGROUND INFORMATION

Facility Description: The Village of Oregon serves a population of approximately 9,500 people with no significant industrial contributions and no significant anticipated growth. The Village operates a wastewater treatment facility (WWTF) that consists of an activated sludge treatment system with grit removal and automated fine screens as preliminary treatment. The activated sludge process is designed to remove phosphorus biologically as well as BOD and suspended solids. Wastewater passes through four final clarifiers for final settling. Chemical phosphorus treatment with Alum is available primarily to treat side streams from sludge processing. Sludge is aerobically digested, thickened with a gravity belt thickener, and stored in a sludge storage tank during months when land spreading is not allowed by law or is impractical due to weather conditions or land availability. Biosolids are ultimately land spread on DNR approved agricultural fields. The plant treats approximately 1.28 MGD of wastewater per day with a design flow of 1.8 MGD. The collection system for the Village of Oregon is a separate sewer system with no constructed overflow points.

Attachment #2 is a USGS topographic map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations: The current permit, expiring on June 30, 2019 includes the following effluent limitations. The permit is being reissued early to allow Oregon's involvement in the Yahara WINS Adaptive Management project.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
BOD ₅			30 mg/L	20 mg/L		1
TSS			30 mg/L	20 mg/L		2
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		4.0 mg/L				1
Phosphorus						3
Interim				1.1 mg/L		
Final				0.225 mg/L	0.075 mg/L	
Ammonia Nitrogen						
Nov-April	25 mg/L			14 mg/L		
May-October			6.4 mg/L	2.7 mg/L		
Mercury	3.6 ng/L					4
Chloride						5
Nitrogen, Total Kjeldahl						5
Nitrogen, Nitrate +						5

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Nitrite Total						
Temperature Maximum						5

Footnotes:

1. These limitations are not being evaluated as part of this review. Because the water quality criteria, reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
2. Additional TSS Limits to comply with the Rock River TMDL are listed below:

Total Suspended Solids Effluent Limitations				
Month	Monthly TSS WLA (tons/month)	Days Per Month	Monthly Ave TSS Effluent Limit (lbs/day)	Weekly Ave TSS Effluent Limit (lbs/day)
Jan	3.83	31	247	348
Feb	4.27	28	305	430
March	4.55	31	294	414
April	4.55	30	303	428
May	4.55	31	294	414
June	4.55	30	303	428
July	4.55	31	294	414
Aug	3.95	31	255	359
Sept	2.49	30	166	234
Oct	4.01	31	259	365
Nov	4.55	30	303	428
Dec	4.0	31	258	364

3. Monthly Phosphorus Mass Limitation required by the Rock River TMDL include:

Total Phosphorus Effluent Limitations			
Month	Monthly WLA (lbs./month)	Days/ Month	Monthly Avg. (lbs./day)
Jan	67.50	31	2.18
Feb	67.92	28	2.43
March	65.38	31	2.11
April	64.69	30	2.16
May	63.34	31	2.04
June	66.09	30	2.20
July	62.68	31	2.02
Aug	60.37	31	1.95
Sept	58.46	30	1.95
Oct	61.83	31	1.99
Nov	64.95	30	2.17
Dec	67.09	31	2.16

4. This is an alternate concentration limit in accordance with s. NR 106.145(5).
5. Monitoring only

Receiving Water Information:

- Name: Oregon Branch (WBIC 800700)
- Classification: The Oregon Branch is classified as limited aquatic life (LAL) for approximately 1.1 miles until the confluence with the Madison Met effluent ditch. From the confluence, the stream is classified as limit forage fish (LFF) for 6.7 miles until the stream crosses CTH A. The Oregon Branch and Rutland Branch join just before CTH A and together become Badfish Creek. After CTH A, Badfish Creek is considered a fish and aquatic life warmwater community.
- Low Flow: The following flow values are from USGS for Station 05430030, where Outfall 001 is located.
 - $7-Q_{10} = 0$ cfs (cubic feet per second)
 - $7-Q_2 = 0.1$ cfs
 - $90-Q_{10} = 0.085$ cfs [85% of $7-Q_2$]
 - Harmonic Mean Flow = 0 cfs

The flow values at the confluence of the Oregon Branch and MMSD channel from the USGS Gage Station located at NW ¼ of SE ¼ of SEC. 6, T5N-R10E.

- $7-Q_{10} = 0.20$ cfs (cubic feet per second)
 - $7-Q_2 = 0.37$ cfs
 - $90-Q_{10} = 0.5$ cfs
 - Harmonic Mean Flow = 2.08 cfs
- Hardness = 347 mg/L as CaCO_3 . This value represents the geometric mean of data from September 20, 2016 through October 3, 2016 as reported on the permit application.
- % of low flow used to calculate limits: 100%. Since background flow is minimal, it is expected effluent will thoroughly mix with any background flow.
- Source of background concentration data: The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for Ammonia Nitrogen are described later. Background concentrations don't impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: Madison Metropolitan Sewerage District effluent ditch and the Oregon Branch join approximately one mile from the Oregon outfall. With a receiving water flow of zero this does not impact the calculated effluent limits.
- Impaired water status: The Oregon Branch is listed as impaired for PCBs.

Effluent Information:

- Design Flow Rate(s):
 - Design Annual average = 1.8 MGD (Million Gallons per Day)

For reference, the actual average flows from the previous permit term are shown in the table below. These values represent a summary of the influent flow rates since Oregon does not report effluent flow rate:

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Average of Influent Flow	MGD
Years	Total
2012	1.026
2013	1.298
2014	1.288
2015	1.164
2016	1.248
Average	1.205

- Hardness = 347 mg/L as CaCO₃. Receiving water hardness and effluent hardness are considered to be equal since this is a low dilution stream.
- Acute dilution factor used: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Effluent characterization: This facility is categorized as a major municipal discharger so the permit application required effluent sample analyses for all the “priority pollutants” except for the Dioxins and Furans, plus Chloride and Hardness. Since multiple samples exist for copper, chloride, and mercury, and chromium those results are summarized below. Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”.

Sample Date	Hg - ng/L	Sample Date	Hg - ng/L	Sample Date	Hg - ng/L
03/15/2012	0.48	10/17/2013	1.6	09/21/2015	0.81
06/27/2012	0.59	01/30/2014	1.2	10/13/2015	0.67
09/26/2012	0.62	05/14/2014	1.2	03/14/2016	1.9
11/29/2012	0.68	08/13/2014	0.61	06/13/2016	1
03/27/2013	0.93	10/16/2014	1.1	08/23/2016	0.55
06/17/2013	1.1	03/02/2015	0.62	10/04/2016	0.63
08/27/2013	0.75	06/01/2015	0.54	02/21/2017	0.96
1-day P ₉₉ = 2.07 ng/L					
4-day P ₉₉ = 1.40 ng/L					
30-day P ₉₉ = 1.05 ng/L					

Sample Date	Cu - µg/L	Sample Date	Cu - µg/L	Sample Date	Cu - µg/L
09/20/2016	5.4	10/09/2016	5	10/07/2016	4.7
09/25/2016	6.8	10/16/2016	4.3	10/31/2016	6.2
09/29/2016	9.6	10/18/2016	4.8	11/07/2016	4.8
10/03/2016	6.2	10/23/2016	23		
1-day P ₉₉ = 27.32 µg/L					
4-day P ₉₉ = 15.78 µg/L					
30-day P ₉₉ = 9.93 µg/L					

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Sample Date	Chloride- mg/L	Sample Date	Chloride- mg/L	Sample Date	Chloride mg/L
01/04/2017	300	02/01/2017	280	03/01/2017	240
01/11/2017	290	02/08/2017	270	03/08/2017	250
01/18/2017	330	02/15/2017	260	03/15/2017	270
01/25/2017	280	02/22/2017	270		
1-day P ₉₉ = 388.5 mg/L					
4-day P ₉₉ = 306.2 mg/L					
30-day P ₉₉ = 287.0 mg/L					

Sample Date	Chromium (+6) µg/L
09/21/2016	2.2
05/23/2017	1.5
Average	1.85

- Water Source: Village of Oregon Municipal wells
- Additives: Chlorine and fluoride are added to the municipal supply. Alum is added for phosphorus removal as needed.

**PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN**

In general, permit limits for toxic substances are recommended whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P₉₉) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

The following tables list the water quality-based effluent limitations for this discharge along with the results of effluent sampling for all the detected substances. All concentrations are expressed in term of micrograms per Liter (µg/L) unless otherwise stated.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)RECEIVING WATER FLOW = 0 cfs (1-Q₁₀ (estimated as 80% of 7-Q₁₀)).

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Arsenic		339.80	339.80	67.96	<1.0		
Cadmium	347	117.41	117.41	23.48	<0.14		
Chromium (+3)	301	4445.84	4445.84	889.17	0.83		
Chromium (+6)		16.02	16.02	3.20	1.85		
Copper	347	50.19	50.19			27.32	23
Lead	347	355.75	355.75	71.15	<1.5		
Mercury		0.83	0.83			0.00207	0.0019
Nickel	268	1048.88	1048.88	209.78	2.3		
Zinc	333	344.68	344.68	68.94	28		
Chloride (mg/L)		757.00	757.00			338.50	330.00

* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105 over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

** Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1Q10 flow rates yields a more restrictive limit than the 2 x ATC method of limit calculation.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)RECEIVING WATER FLOW = 0 cfs (¼ of the 7-Q₁₀)

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK- GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Arsenic		152.20		152.20	30.44	<1.0	
Cadmium	175	3.82		3.82	0.76	<0.14	
Chromium (+3)	301	325.75		325.75	65.15	0.83	
Chromium (+6)		10.98		10.98	2.20	1.85	
Copper	347	30.01		30.01			15.78
Lead	347	93.18		93.18	18.64	<1.5	
Mercury		0.44		0.44			0.0014
Nickel	268	169.08		169.08	33.82	2.3	
Selenium		46.50		46.50	9.30	<2.0	
Zinc	333	344.68		344.68	68.94	28	
Chloride (mg/L)		395.00		395.00		276.00	306.00

* The indicated hardness may differ from the receiving water hardness because the receiving water hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the chronic criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

Monthly Average Limits based on Wildlife Criteria (WC)RECEIVING WATER FLOW = 0 cfs (¼ of the 90-Q₁₀)

SUBSTANCE	WC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P ₉₉
Mercury (ng/L)	1.3		1.3		0.88	1.05

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 0 cfs (¼ of the Harmonic Mean)

SUBSTANCE	HTC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Antimony	1120		1120	224	0.31
Cadmium	880		880	176	<0.14
Chromium (+3)	8400000		8400000	1680000	0.83
Chromium (+6)	16800		16800	3360	2.2
Lead	2240		2240	448	<1.5
Mercury	336		336		0.00088
Nickel	110000		110000	22000	2.3
Selenium	28000		28000	5600	<2.0
Silver	28000		28000	5600	0.45

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0 cfs (¼ of the Harmonic Mean)

SUBSTANCE	HCC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	40		40	8	<1.0

Because effluent data is available for only one substance for which Human Cancer Criteria exists, and it was not detected in the effluent, determination of the cumulative cancer risk is not needed.

Conclusions and Recommendations: Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are not needed for any of the parameters listed above.

Mercury – The water quality-based effluent limit for total recoverable mercury is set equal to the most stringent criterion of 1.3 ng/L because the background concentration in the receiving water and similar inland streams is known to exceed 1.3 ng/L. The current permit has a variance limit and requires quarterly monitoring of the influent and effluent for total recoverable mercury. A total of 21 effluent sampling results are available from March 2012 through February 2017 for total recoverable mercury. The average concentration was 0.88 ng/L, and the maximum was 1.9 ng/L. Because the 30-day P₉₉ of available data

(1.05 ng/L) is less than the most stringent water quality based effluent limit of 1.3 ng/L, **no WQBEL for mercury is recommended for permit reissuance. A minimum of quarterly mercury monitoring is required pursuant s. NR 106.145 (3) (a) 2, Wis. Adm. Code.**

Chloride – Considering available effluent data from the current permit term (January 2017 through March 2017), the 1-day P₉₉ chloride concentration is 389 mg/L, and the 4-day P₉₉ of effluent data is 306 mg/L. These effluent concentrations are below the calculated WQBELs for chloride, therefore **no effluent limits are needed. Four samples per month (on consecutive days) are recommended in the last year of the permit term.**

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

Section NR 106.33(2), Wis. Adm. Code was updated effective September 1, 2016. As a result, seasonal 20 and 40 mg/L thresholds for including ammonia limits in municipal discharge permits are no longer applicable under current rules. As such, s. NR 106.33(1), Wis. Adm. Code enables the Department to determine the need to include ammonia limits in municipal discharge permits based on the statistical comparisons in s. NR 106.05, Wis. Adm. Code.

Ammonia limits were last calculated in the August 10, 2005 WQBEL memo. At that time, default stream pH and temperatures were used to calculate limits. At this time, though, more specific information is available for both parameters. Additionally, recent updates to subchapter IV of Ch. NR 106, Wis. Adm. Code (effective September 1, 2016) outline the option for the Department to implement use of the 1-Q₁₀ receiving water low flow to calculate daily maximum ammonia nitrogen limits if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. Considering the changes, the new ambient values are used in conjunction with the effluent and stream low flows to re-calculate limits using the procedure in s. NR 106.32, Wis. Adm. Code.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC):

Daily maximum limitations are based on acute toxicity criteria, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation.

$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - \text{pH})})] + [B \div (1 + 10^{(\text{pH} - 7.204)})]$$

Where:

A = 0.411 and B = 58.4 for a Limited Forage Fishery, and

A = 0.633 and B = 90.0 for Limited Aquatic Life, and

pH (su) = that characteristic of the effluent.

The effluent pH data for the past three years was examined as part of this evaluation. A total of 824 sample results were reported from January 2012 through March 2017. The maximum reported value was 8.1 s.u. (Standard pH Units), and a pH of greater than 8.0 s.u. was reported seven times. More than 99% of the time the pH was 7.98 s.u. or less. The 1-day P₉₉, calculated in accordance with s. NR 106.05(5), is 7.96 s.u., and the mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 7.95 s.u. A value of 7.96 s.u. is believed to

represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.96 s.u. into the equation above yields an ATC = 13.97 mg/L for the LAL segment of the Oregon Branch. The ATC at the confluence of the Oregon Branch and the Madison Met. effluent ditch is 9.06 mg/L.

As mentioned previously, updates to subchapter IV of ch. NR 106, Wis. Adm. Code outline the option for the Department to implement use of the 1-Q₁₀ receiving water low flow to calculate daily maximum ammonia nitrogen limits if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. If such a determination can be made, the outcome of these changes could range from limits being reduced by 50 % from the previous method of calculation (assuming maximum effluent pH has not changed) if the 1-Q₁₀ receiving water low flow is 0 cfs, to no change from the 2004 method of calculation if sufficient dilution is available - because the calculated limits using the 1-Q₁₀'s may exceed the limits calculated using the original 2× acute toxicity criterion (ATC) approach. The more restrictive of the 2×ATC approach or the 1-Q₁₀ limits should be included in the permit in accordance with s. NR 106.06(3)(b)3.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q₁₀ (estimated as 80 % of 7-Q₁₀) and the 2×ATC approach are shown below.

Summary of Calculated Daily Maximum Ammonia Nitrogen Effluent Limitations, in mg/L

Classification	Month	April-May	June - September	October-Mar
LAL	2×ATC	27.94	27.94	27.94
LAL	1-Q ₁₀	13.97	13.97	13.97
LFF	2×ATC	18.13	18.13	18.13
LFF	1-Q ₁₀	9.61	9.61	9.61

As shown in the table, the daily maximum ammonia nitrogen limits calculated using the 1-Q₁₀ are more restrictive than the limits calculated using the 2 × ATC approach. A data summary is provided on the next page. Note the LFF limitations are adjusted for decay later in the discussion.

Weekly Average & Monthly Average Limits based on Chronic Toxicity Criteria (CTC):

The ammonia limit calculation also warrants reevaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water.

Weekly average and monthly average limits for Ammonia Nitrogen are based on chronic toxicity criteria. The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified for Limited Aquatic Life is calculated by the following equation.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (su) of the receiving water,

E = 1.0,

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$$C = 8.09 \times 10^{(0.028 \times (25 - T))}$$

T = the temperature of the receiving (°C)

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Limited Forage Fishery is calculated by the following equation. Limits are adjusted for decay later in this report.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (su) of the receiving water,

E = 1.0,

C = the minimum of 3.09 or $3.73 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or

C = $3.73 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and

T = the temperature (°C) of the receiving water – (Early Life Stages Present), or

T = the maximum of the actual temperature (°C) and 7 – (Early Life Stages Absent)

The 4-day criterion is simply equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q₁₀ (4-Q₃, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q₅ (estimated as 85% of the 7-Q₂ if the 30-Q₅ is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature. 100% of the flow is used if the Temperature ≥ 16 °C. Only 25% of the flow is used if the Temperature < 11 °C. And 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

The rules provide a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 °C, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in the Oregon Branch, based on conversations with local fisheries biologists. So “ELS Absent” criteria apply from October through March, and “ELS Present” criteria will apply from April through September.

Since minimal ambient data is available, the “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, shown in the table below, with the resulting criteria and effluent limitations.

Limited Aquatic Life		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Background Information:	7-Q ₁₀ (cfs)	0	0	0
	7-Q ₂ (cfs)	0.1	0.1	0.1
	Ammonia (mg/L)	0.09	0.07	0.135
	Temperature (°C)	15	19	7
	pH (su)	8.09	8.08	7.98
	% of Flow used	100	100	100
	Reference Weekly Flow (cfs)	0	0	0
	Reference Monthly Flow (cfs)	0.085	0.085	0.085
Criteria mg/L:	4-day Chronic	33.72	22.75	56.72
	30-day Chronic	13.49	9.10	22.69
Effluent Limits mg/L:	Weekly Average	33.72	22.75	56.72
	Monthly Average	13.90	9.38	23.38

Limited Forage Fish		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Background Information:	7-Q ₁₀ (cfs)	0.2	0.2	0.2
	7-Q ₂ (cfs)	0.37	0.37	0.37
	Ammonia (mg/L)	0.09	0.07	0.135
	Temperature (°C)	15	19	7
	pH (s.u.)	8.21	8.21	7.98
	% of Flow used	100	100	100
	Reference Weekly Flow (cfs)	0.2	0.2	0.2
	Reference Monthly Flow (cfs)	0.3145	0.3145	0.3145
Criteria mg/L:	4-day Chronic			
	Early Life Stages Present	5.60	5.60	
	Early Life Stages Absent			30.62
	30-day Chronic			
	Early Life Stages Present	2.24	2.24	
	Early Life Stages Absent			12.25
Effluent Limitations mg/L:	Weekly Average			
	Early Life Stages Present	6.00	6.00	
	Early Life Stages Absent			32.81
	Monthly Average			
	Early Life Stages Present	2.48	2.49	
	Early Life Stages Absent			13.62

Ammonia Decay:

When evaluating the limits necessary to protect the Oregon Branch at the classification change from LAL to LFF, decay of ammonia as it travels from the outfall to the confluence with the Madison Met. effluent channel must be accounted for. Ammonia decay rates are dependent upon temperature and instream nitrification. Instream decay is expressed as first order decay model shown below:

$$N_{Limit} = \left(\frac{N_{down}}{EXP(-k_t T)} \right)$$

Where: N_{Limit} = Ammonia limit needed to protect downstream use (mg/L)
 N_{down} = Ammonia limit calculated based on downstream classification (mg/L)
 $-k_t$ = Ammonia decay rate at background stream temperature (day⁻¹)
 T = Travel time from outfall to downstream use (day)

Based on the available literature a decay rate of 0.25 day⁻¹ at 20°C is suggested as a default rate. Use of a temperature correction factor of $\theta = 1.08$ is also suggested for temperatures above 10°C ($k_t = k_{20} \theta^{(T-20)}$). The velocity of the receiving water is assumed to be 5 miles per day and the distance from the point of discharge to the confluence is approximately 1.11 miles. This yields a travel time of roughly 0.22 days. The table below shows the calculated effluent limits that were adjusted for decay from the limits necessary to protect the downstream reach.

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Ammonia Limits	Limited Forage Fish	Adjusted for Decay
April – May	mg/L	mg/L
Daily Max	9.61	10.0
Weekly Avg	6.00	6.23
Monthly Avg	2.48	2.58
June – Sept		
Daily Max	9.61	10.1
Weekly Avg	6.00	6.31
Monthly Avg	2.49	2.62
Oct – March		
Daily Max	9.61	9.80
Weekly Avg	32.81	33.48
Monthly Avg	13.62	13.9

Conclusions and Recommendations:

In summary, after rounding to two significant figures, the following effluent limitations for Ammonia Nitrogen are recommended for the Village of Oregon. No mass limitations are recommended in accordance with s. NR 106.32(5). The more stringent of the LAL limit or decay adjusted LFF limits are shown below.

Months	Daily Maximum	Weekly Average	Monthly Average
April & May	10	6.2	2.6
June – September	10	6.3	2.6
October – March	10	33	14

The values in **bold** indicate those monitoring periods in which limits were included in the previous permit. Since the month distribution has changed, winter (previously Nov.-Apr) limits from the previous permit are now represented by April-May and October-March, and the summer (previously May-October) limits are represented as June-September. Where there are existing ammonia nitrogen limits in the permit, the limits are recommended to be retained regardless of reasonable potential, consistent with s. NR 106.33(1), Wis. Adm. Code.

The following table evaluates the statistics based upon ammonia data reported from January 2012-March 2017, with those results being compared to the calculated limits to determine the need to include ammonia limits in the permit for the months and averaging periods where there currently isn't a limit. That need is determined by calculating 99th upper percentile (or P₉₉) values for ammonia during each of the three periods of months and comparing P₉₉ values to associated limits. Comparing the above calculated limits to the corresponding P₉₉s, there is no reasonable potential to exceed any of the limits and therefore limits are not recommended unless there was a limit in the previous permit or a limit is needed to comply with the expression of limits requirements in s. 106.07 (3), Wis. Adm. Code.

Attachment #1

	Ammonia mg/L April - May	Ammonia mg/L June - September	Ammonia mg/L October - March
1-day P ₉₉	0.16	0.53	0.71
4-day P ₉₉	0.10	0.29	0.42
30-day P ₉₉	0.07	0.15	0.18
Mean*	0.054	0.087	0.071
Std	0.029	0.112	0.190
Sample size	133	246	430
Range	<0.015-0.2	0.015-0.83	<0.025-3.11

PART 4 –PHOSPHORUS

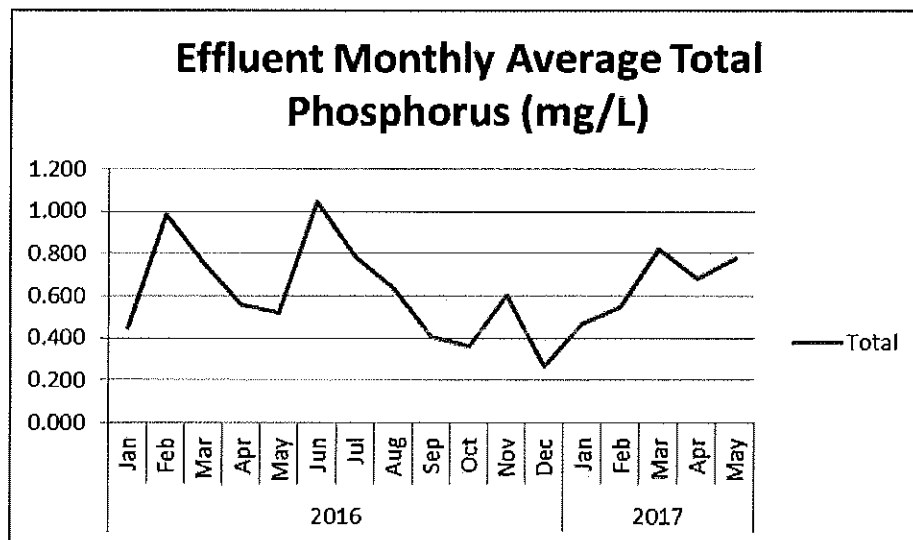
Section NR 217.16, Wis. Adm. Code states that the Department may include a TMDL-derived water quality based effluent limit (WQBEL) for phosphorus in addition to, or in lieu of, a s. NR 217.13, Wis. Adm. Code WQBEL in a WPDES permit. The Rock River TMDL was developed to protect the water quality of impaired waters within the watershed and the discharge from the Oregon WWTF is to the Oregon Branch within the basin. Since the Oregon Branch was not listed as impaired prior to TMDL development, the TMDL-based phosphorus mass limits were included in the permit at the last reissuance in addition to the s. NR 217.13, Wis. Adm. Code WQBEL. Oregon was unable to meet these limits, and a compliance schedule and an interim limit of 1.1 mg/L were required in the permit.

The Rock River remains impaired for phosphorus; meaning the Rock River TMDL limits remain applicable. Additionally, the WQBELs to protect the downstream Badfish Creek are still required. The following limits from the current permit are recommended to be retained for phosphorus:

Total Phosphorus Effluent Limitations			
Month	Monthly Ave (lbs/day)	Monthly Ave (mg/L)	Six-Month Ave (mg/L)
Jan	4.3	0.225	0.075 (Nov- April)
Feb	5.6	0.225	
March	4.9	0.225	
April	5.3	0.225	
May	5.2	0.225	0.075 (May- Oct)
June	5.3	0.225	
July	5.1	0.225	
Aug	4.6	0.225	
Sept	4.9	0.225	
Oct	4.1	0.225	
Nov	4.0	0.225	
Dec	3.9	0.225	

Attachment #1

As part of the compliance schedule, Oregon has notified the Department of its intent to use adaptive management to comply with the limits. In accordance with s. NR 217.18 (3) (e) 2, Wis. Adm. Code, the effluent concentration limits shall be 0.6 mg/L expressed as a six-month average and 1.0 mg/L as a monthly average in the first permit of an adaptive management plan. If the permittee is unable to meet this value, a compliance schedule and an interim limit of 1.0 mg/L may be included in the reissued permit. Based upon available data from the previous 12 months, it appears that Oregon can comply with the 1.0 mg/L monthly average limit, but cannot immediately comply with the 0.6 mg/L six-month interim limit upon permit issuance. **Since Oregon can meet the 1.0 mg/L monthly average limit, this limit is recommended to be effective when the permit is reissued, and a short schedule allowed for compliance with the 0.6 mg/L six-month average limit. The Rock River TMDL mass limits shall also be included and become effective once the adaptive management project is complete or terminated (ss. NR 217.18 93) (e) &(g), Wis. Adm. Code).**



Monthly average concentration (mg/L)	
Jun-16	1.047
Jul-16	0.784
Aug-16	0.634
Sept-16	0.406
Oct-16	0.359
Nov-16	0.603
Dec-16	0.265
Jan-17	0.467
Feb-17	0.544
Mar-17	0.823
Apr-17	0.683
May-17	0.775

Six-Month average concentration (mg/L)	
May-Oct	0.667
Nov-Apr	0.564

PART 5 –THERMAL

New surface water quality standards for temperature took effect on October 1, 2010. These new regulations are detailed in Chapter NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. The daily maximum effluent temperature limitation shall be 86 °F for discharges to surface waters classified as Limited Aquatic Life according to s. NR 104.02(3)(b)1, except for those classified as wastewater effluent channels and wetlands regulated under ch. NR 103 [s. NR 106.55(2), Wis. Adm. Code] which have effluent temperature limitations of 120 °F.

Reasonable Potential

Based on the available discharge temperature data (January 2012-December 2013) shown below, the maximum daily effluent temperature reported was 73 °F; therefore, no reasonable potential for exceeding the daily maximum limit exists, and **no limits are recommended**. The current permit requires temperature monitoring for calendar year 2018. Since the permit will be reissued prior to this requirement becoming effective, a minimum of one year of temperature monitoring is recommended for the reissued permit.

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	54	54	-	86
FEB	51	52	-	86
MAR	56	57	-	86
APR	57	58	-	86
MAY	62	64	-	86
JUN	63	63	-	86
JUL	72	72	-	86
AUG	72	72	-	86
SEP	72	73	-	86
OCT	66	68	-	86
NOV	61	61	-	86
DEC	59	60	-	86

PART 6 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. The following evaluation is based on procedures in the Department's WET Program Guidance Document (revision #11, dated November 1, 2016).

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC_{50} (Lethal Concentration to 50% of the test organisms) greater than 100% effluent.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} (Inhibition Concentration) greater than the instream waste concentration (IWC). The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 33% shown in the WET Checklist summary below would normally be calculated according to the following equation, as specified in s. NR 106.03(6):

$$IWC \text{ (as \%)} = Q_e \div \{(1 - f)Q_e + Q_s\} \times 100$$

Where:

Q_e = annual average flow = 1.8 MGD = 2.79 cfs

f = fraction of the Q_e withdrawn from the receiving water = 0

Q_s = 100 % of the 7-Q₁₀ = 5.7 cfs (based upon the flow in Badfish Creek at CTH A, where the stream is expected to have full fish and aquatic life use.)

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the Oregon Branch. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data. Data which is not believed to be representative of the discharge is not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations.

WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Chronic Results IC ₂₅ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Used in RP?	
04/22/1998	>100	>100	Pass	Yes	>100	N/A	N/A	No	Results unreliable (1)
05/14/1999	>100	>100	Pass	Yes	>80	>80	Pass	Yes	
05/23/2006	>100	>100	Pass	Yes	55.95	>100	Pass	Yes	
07/17/2007	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
01/31/2008	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/13/2009	>100	>100	Pass	No	>100	>100	Pass	No	Results unreliable (2)
01/06/2015	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
05/03/2016	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

Footnotes:

- 1) *Qualified or Inconclusive Data.* QA concerns were noted during testing which calls into question the reliability of the test results.
 - 2) *Tests done by S-F Analytical, July 2008 – March 2011.* The DNR has reason to believe that WET tests completed by SF Analytical Labs from July 2008 through March 31, 2011 were not performed using proper test methods. Therefore, WET data from this lab during this period has been disqualified and was not included in the analysis.
- WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. **WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.**

According to s. NR 106.08(6)(d), TUa effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC50, IC25 or IC50 \geq 100 %).

Acute Reasonable Potential = $0 < 1.0$, reasonable potential is not shown and a limit is not required.

Chronic Reasonable Potential = [(TUc effluent) (B)(IWC)]

TUc (maximum) 100/IC25	B (multiplication factor from s. NR 106.08(5)(c), Wis. Adm. Code, Table 4)	IWC
100/55.95	6.2 Based on 1 detects	33%

$$[(TUc \text{ effluent}) (B)(IWC)] = 3.65 > 1.0$$

Attachment #1

Therefore, reasonable potential is shown for chronic WET using the procedures in s. NR 106.08(6) and representative data from 1998-2016 and limits are required.

Expression of WET limits

Chronic WET limit = $100/33 = 3.0 \text{ TU}_c$ expressed as a monthly average

The WET Checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other permit conditions. The Checklist steps the user through a series of questions that evaluate the potential for effluent toxicity. The Checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code, and recommends monitoring frequencies based on points accumulated during the Checklist analysis. As toxicity potential increases, more points accumulate and more monitoring is recommended to ensure that toxicity is not occurring. The completed WET Checklist recommendations for this permittee are summarized in the table below. Staff recommendations, based on the WET Checklist and best professional judgment, and are provided below the summary table. For guidance related to RP and the WET Checklist, see Chapter 1.3 of the WET Guidance Document: <http://dnr.wi.gov/topic/wastewater/WETguidance.html>.

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable.	IWC = 33 %. 10 Points
Historical Data	tests used to calculate RP = 6 tests failed = 0	tests used to calculate RP = 5 tests failed = 0
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations 0 Points	Same as Acute. 0 Points
Receiving Water Classification	Variance Water 0 Points	Same as Acute. 0 Points
Chemical-Specific Data	Ammonia limits based on ATC = 5 points Chloride, Copper, Chromium, Mercury, Nickel, Silver, and Zinc detected = 3 points Antimony detected = 2 points 10 Points	Ammonia limits based on ATC = 5 points Chloride, Copper, Chromium, Mercury, Nickel, Silver, and Zinc detected = 3 points Antimony detected = 2 points 10 Points
Additives	0 Biocides and 0 Water Quality Conditioners added. SorbX-100 Used: No 0 Points	All additives not used more than once per 4 days. 0 Points
Discharge Category	0 Industrial Contributors. 0 Points	Same as Acute. 0 Points
Wastewater Treatment	Secondary or Better 0 Points	Same as Acute. 0 Points

Attachment #1

Downstream Impacts	No impacts known 0 Points	Same as Acute. 0 Points
Total Checklist Points:	10 Points	20 Points
Recommended Monitoring Frequency (from Checklist):	1x yearly	1x yearly
Limit Required?	No	No
TRE Recommended? (from Checklist)	No	No

- Following the guidance provided in the Department's WET Program Guidance Document (revision #11, dated November 1, 2016), based upon the point totals generated by the WET Checklist, other information given above, and Chapter 1.3 of the WET Guidance Document, annual acute WET testing is recommended and annual chronic WET testing is recommended in the reissued permit. Tests should be done in rotating quarters, to collect seasonal information about this discharge. WET testing shall continue after the permit expiration date (until the permit is reissued).
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The chronic WET limit should be expressed as 3.0 TUC as a monthly average in the effluent limits table of the permit.
- A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations at 40 CFR Part 122.44(i) requires that monitoring occur at least once per year when a limit is present.
- A minimum of annual acute and chronic monitoring is recommended because the Village of Oregon WWTF is a major municipal discharger with a design flow greater than 1.0 MGD. Federal regulations at 40 CFR Part 122.21(j) require at least 4 acute and chronic WET tests with each permit application on samples collected since the previous reissuance. Therefore, annual monitoring is recommended in the permit term, so that data will be available for the next permit application.

PART 7 – Expression of Limits

The following review is based on updates to chapters NR 106 and 205 of the Wisconsin Administrative Code that became effective on September 1, 2016.

Expression of Limits

Revisions to ch. NR 106 align Wisconsin's water quality-based effluent limitations with 40 CFR 122.45(d), which requires WPDES permits contain the following limits, whenever practicable and necessary to protect water quality:

- Weekly average and monthly average limitations for publically owned treatment works (POTWs), and
- Daily maximum and monthly average limitations for all other discharges.

The Village of Oregon WWTF is a POTW, and is therefore subject to weekly average and monthly average limitations whenever limitations are determined to be necessary.

Attachment #1

This evaluation provides additional limitations necessary to comply with the expression of limits in s. NR 106.07. Pollutants already compliant with s. NR 106.07 or that have an approved impracticability demonstration, are excluded from this evaluation including water-quality based effluent limitations for phosphorus, temperature, and pH, among other parameters.

Additional limitations needed to comply with s. NR 106.07 Expression of limits:

Parameter	Daily Maximum	Weekly Average	Monthly Average	Multiplication Factor (CV)	Assumed Monitoring Frequency (n)
Ammonia					
April-May	10 mg/L	6.2 mg/L ₁	2.6 mg/L	N/A	N/A
June-September		6.3 mg/L	2.6 mg/L		
October-April	10 mg/L	10 mg/L ₁	10 mg/L ₁		

Method for calculation:

The methods for calculating limitations for municipal POTWs to conform to 40 CFR 122.45(d) are specified in s. NR 106.07(3), and are as follows:

1. Whenever a daily maximum limitation is determined necessary to protect water quality, a weekly and monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality.
2. Whenever a weekly average limitation is determined necessary to protect water quality, a monthly average limitation shall also be included in the permit and set equal to the weekly average limit unless a more restrictive limit is already determined necessary to protect water quality.
3. Whenever a monthly average limitation is determined necessary to protect water quality, a weekly average limit shall be calculated using the following procedure and included in the permit unless a more restrictive limit is already determined necessary to protect water quality:

$$\text{Weekly Average Limitation} = (\text{Monthly Average Limitation} \times \text{MF})$$

Where:

MF= Multiplication factor as defined in Table 1

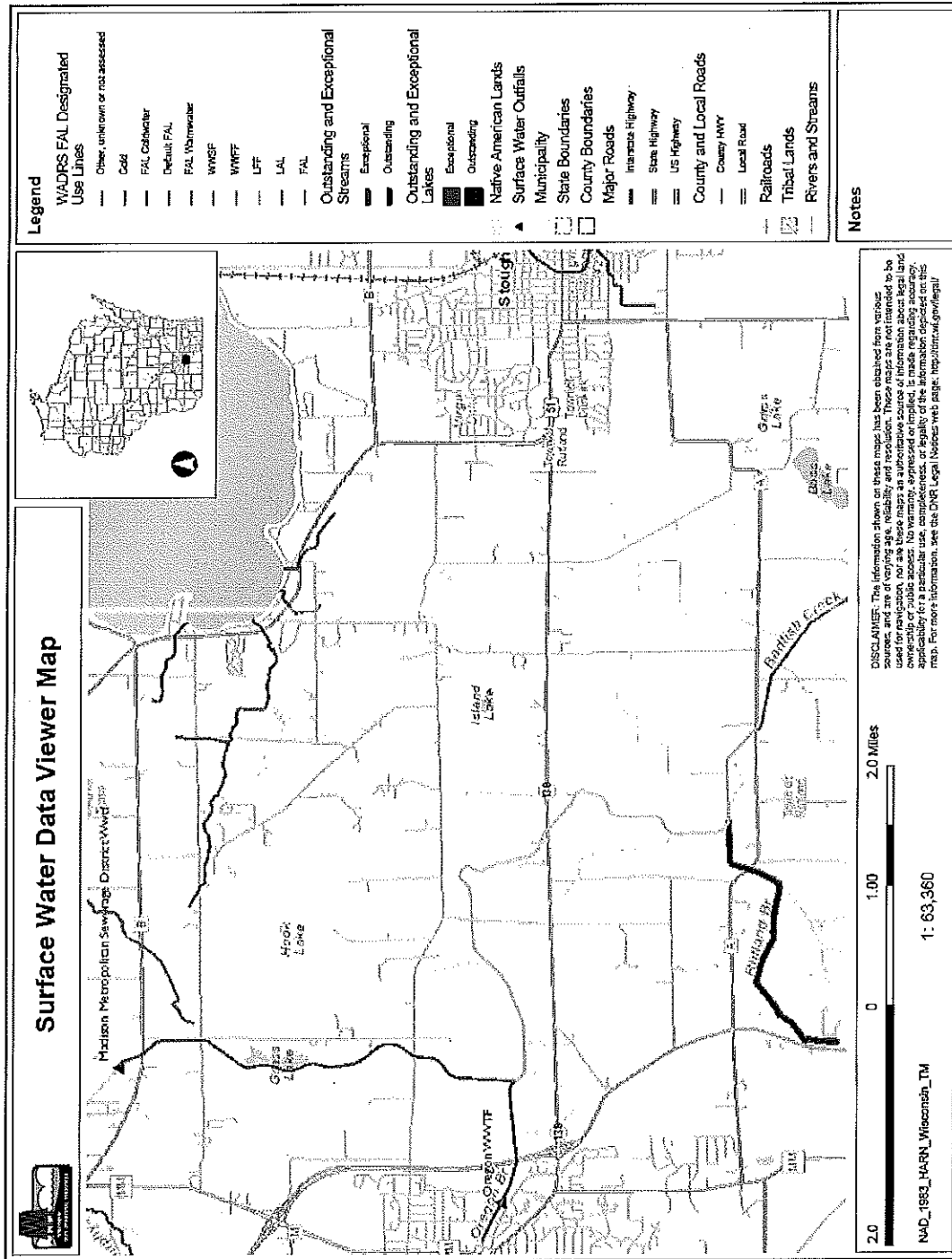
CV= coefficient of variation (CV) as calculated in s. NR 106.07(5m)

n= the number of samples per month required in the permit

s. NR 106.07 (3) (e) 4. Table 1 — Multiplication Factor (for CV = 0.6)

CV	n=1	n=2	n=3	n=4	n=8	n=12	n=16	n=20	n=24	n=30
0.6	1.00	1.31	1.51	1.64	1.95	2.12	2.23	2.30	2.36	2.43

Note: This methodology is based on the *Technical Support Document for Water Quality-based Toxics Control* (March 1991). PB91-127415.



Watershed Adaptive Management Request

Form 3200-139 (1/12)

Page 1 of 3

Notice: Pursuant to s. NR 217.18, Wis. Adm. Code, this form must be completed and submitted to the Department at the time of the reissuance of an existing WPDES (Wisconsin pollutant discharge elimination system) permit to request adaptive management for phosphorus water quality based effluent limits (WQBEL). Failure to provide all requested information may result in denial of your request. Personal information collected will be used for administrative purposes and may be provided to requestors to the extent required by Wisconsin Open Records law [ss. 19.31-19.39, Wis. Stats.].

Type of Request:

- ☒ This is the formal adaptive management request as required in s. NR 217.18(2)
☐ This is a preliminary adaptive management request (to be submitted as part of facility planning.)

Facility and Permit Information

Facility Name Village of Oregon Wastewater Treatment Facility		WPDES Permit No. WI - 0020681-08-0	
Facility Address 101 North Perry Parkway	City Oregon	State WI	ZIP Code 53576
Receiving Water Oregon Branch discharging to Badfish Creek and eventually to the Yahara River.			

Owner Contact Information

Last Name Rau	First Name Jeff	MI	Phone No. (incl. area code) (608) 835-6290
Street Address 117 Spring Street			FAX Number (608) 835-6503
City Oregon	State WI	ZIP Code 53575	Email address jrau@vil.oregon.wi.us

Facility Information

Provide listed information for each lagoon or pond basin

Required for AM Request	Wis. Administrative Code Reference	Conclusion	Evidence/Source of information (attach as needed)
1. NPS contribute at least 50% of total P contribution	s. NR 217.18(2)(b)	<input checked="" type="checkbox"/> NPS contributes at least 50% <input type="checkbox"/> NPS DOES NOT contribute at least 50%	Rock River TMDL
2. WQBEL Requires Filtration	s. NR 217.18(2)(c)	<input checked="" type="checkbox"/> Filtration required <input type="checkbox"/> Filtration NOT required	See current facility operation below.
3. AM Plan	s. NR 217.18(2)(d)	<input checked="" type="checkbox"/> Plan is Included – Page 3 <input type="checkbox"/> Plan is NOT Included <i>For a preliminary adaptive management request, AM plan not required</i>	Preliminary plan for Yahara Watershed submitted to DNR by Madison Metropolitan Sewerage District

Facility Operation and Performance

- Current P removal capability** – If the facility is currently required by a WPDES permit to monitor effluent phosphorus (P) provide a summary of the influent and effluent annual average P concentrations for each of the past three (3) years. If permit required P data is not available, the applicant should provide any other P data that may be applicable and available. If no data is available, the Department may estimate the P effluent concentration by based on data from other similar facilities.

The Oregon WWTF currently employs a combination of biological and chemical phosphorus removal to meet their 1.1 mg/L total phosphorus limit. Phosphorus treatment optimization at the WWTP has been achieved through a combination of in-plant process testing, modification to the controls of the biological phosphorus removal system, and changes to the configuration of the biological phosphorus removal system. The combination of these items has allowed the WWTP to decrease their chemical use while maintaining or increasing their phosphorus removal efficiency. Data from the end of 2016 (past three years attached) shows the decreasing trend of effluent phosphorus concentration and loading. At the same time chemical additions have been significantly decreased. This trend has been observed on a short term basis. The hope is that the trend will continue long term, however the reliability of the process is not known.

While significant improvements to the phosphorus removal efficiency have been observed, it is not anticipated that the WWTF will be able to achieve the 0.075 mg/L limit without major facility upgrades.

Watershed Adaptive Management Request

Form 3200-139 (1/12)

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2. **Facility Operation** – Provide a summary description of overall facility operation. If not a continuously discharging facility, describe storage procedures and the time periods when effluent discharge occurs.

The WWTP includes an influent pump station, preliminary treatment with influent fine screening, vortex grit removal and grit washing, flow metering, and sampling, activated sludge with biological phosphorus removal, final clarification, effluent flow metering and sampling, and effluent re-oxygenation. Waste activated sludge is fed into the auto-thermal aerobic digestion system, thickened using a gravity belt thickener, and stored for 180 days. Class B liquid sludge is land applied on local fields in the spring and fall.

The facility also includes a hauled waste receiving station for receiving septic and holding tank wastes.

3. **Previous Studies** – Reference or attach any facility planning or evaluation study that evaluated facility performance capabilities (Note – Only include studies that are recent, within 5 years, or otherwise applicable for the evaluation of the existing facility and current conditions).

None.

Adaptive Management Plan (s. NR 217.18(d))

This section should summarize the Adaptive Management Plan for internal and external review. A complete Adaptive Management Plan should be attached. Note: If this is a preliminary adaptive management request, this section is not required.

Watershed	Percent Contribution of Applicant Discharge
Yahara River	

Action Area (include map)

The action area for this plan is the entire Yahara Watershed. See Attachment A.

Watershed Characteristics and Timeline Justification

The Yahara Watershed is located in south-central Wisconsin. The watershed is home to a mix of dairy operations, cash crops and intensive urban use. Long-term urban and agricultural development has led to accumulated legacy phosphorus which is anticipated to take several years to reduce.

Key Proposed Actions

There will be a suite of runoff-reducing practices implemented as part of this plan, as well as outreach/education efforts and water quality monitoring activities, all of which are identified and discussed in the preliminary adaptive management plan.

Key Goals and Measures for Determining Effectiveness

The primary goal of the plan is to meet the TMDL allocations for all participating partners. A combination of modeling, effluent and water quality monitoring will be used to determine the effectiveness of the project.

Partner(s)

See attached.

Watershed Adaptive Management Request

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Funding Sources

Intergovernmental Agreement participants, County, State and Federal (e.g. Regional Conservation Partnership Program, Clean Lakes Alliance, Madison Gas & Electric, USGS, and others).

Adaptive Management Request and Certification

Based on the information provided, I am requesting the Watershed Adaptive Management option to achieve compliance with phosphorus water quality standards in accordance with s. NR 217.19, Wis. Adm. Code.

I certify that the information provided with this request is true, accurate and complete to the best of my knowledge.

Print or type name of person submitting request*

Jeff Rau, P.E.

Title

Director of Public Works

Signature of Official

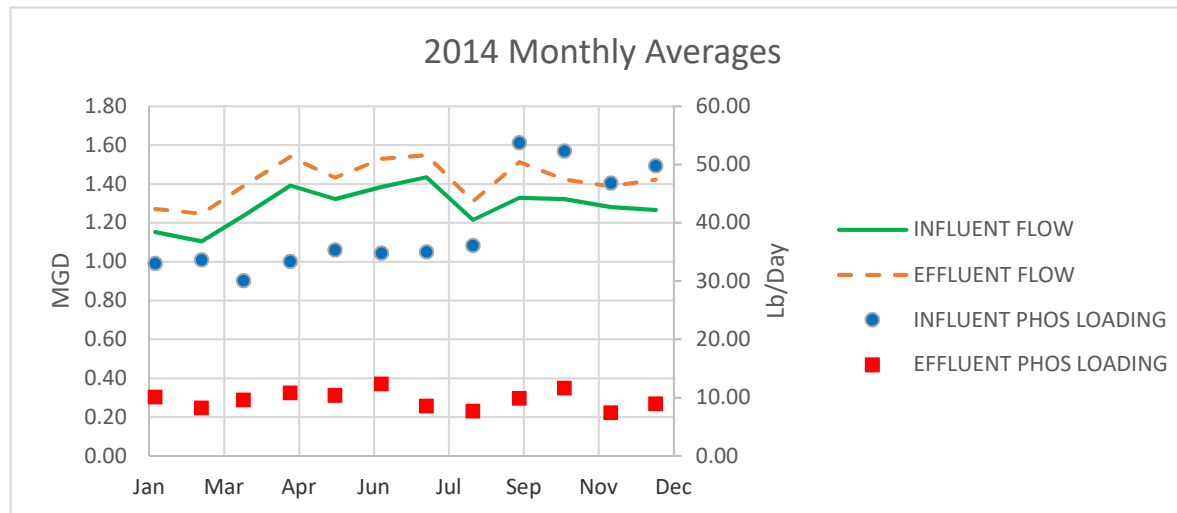
Date Signed

1/25/17

*Must be an Authorized Representative for the treatment facility

Village of Oregon
WWTP Phosphorus Data

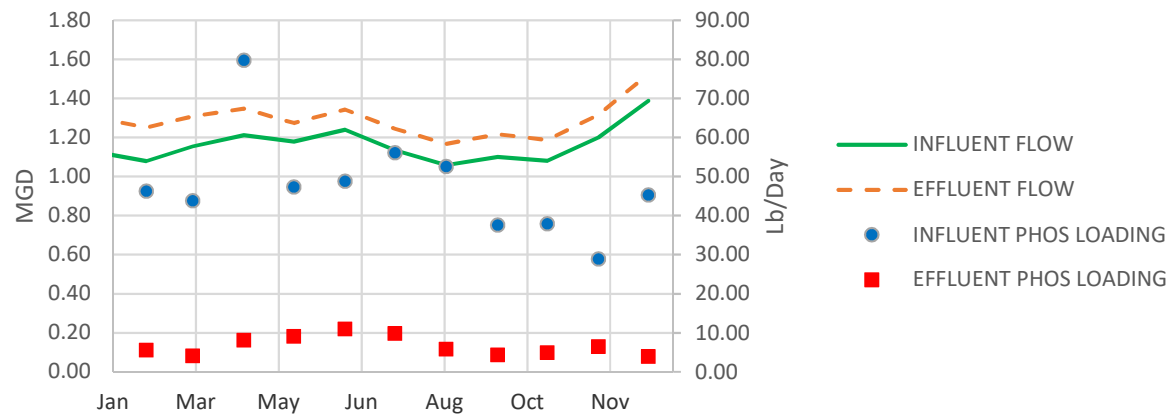
2014 Monthly Averages	Influent Flow	Influent Total Phos	Influent Phos Loading	Effluent Flow	Effluent Total Phos	Effluent Phos Loading
	MGD	MG/L	LB/DAY	MGD	MG/L	LB/DAY
January-14	1.15	3.49	33.05	1.27	0.97	10.07
February-14	1.10	3.56	33.66	1.25	0.79	8.25
March-14	1.24	3.01	30.07	1.39	0.83	9.57
April-14	1.39	3.15	33.36	1.54	0.85	10.81
May-14	1.32	3.19	35.33	1.43	0.86	10.36
June-14	1.38	3.01	34.79	1.53	0.97	12.35
July-14	1.43	2.94	34.99	1.55	0.67	8.56
August-14	1.22	3.63	36.10	1.31	0.70	7.69
September-14	1.33	5.02	53.73	1.51	0.79	9.85
October-14	1.32	4.55	52.30	1.42	0.99	11.60
November-14	1.28	4.39	46.81	1.39	0.64	7.41
December-14	1.27	4.64	49.80	1.42	0.75	8.95
Maximum	1.43	5.02	53.73	1.55	0.99	12.35
Minimum	1.10	2.94	30.07	1.25	0.64	7.41
Average	1.29	3.71	39.50	1.42	0.82	9.62



Village of Oregon
WWTP Phosphorus Data

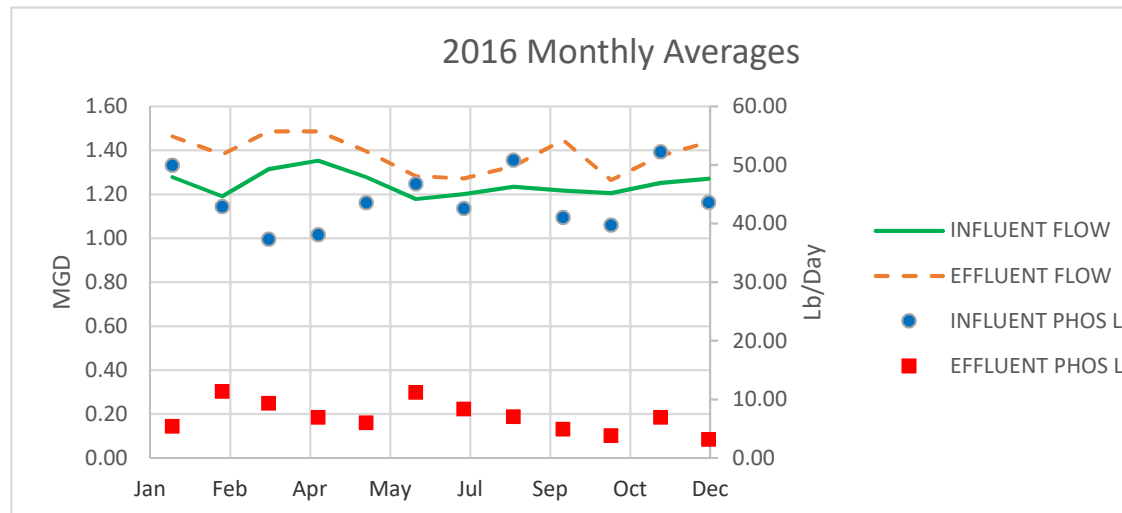
2015 Monthly Averages	Influent Flow MGD	Influent Total Phos MG/L	Influent Phos Loading LB/DAY	Effluent Flow MGD	Effluent Total Phos MG/L	Effluent Phos Loading LB/DAY
January-15	1.13	5.00	46.71	1.30	1.01	10.97
February-15	1.08	5.14	46.23	1.25	0.54	5.53
March-15	1.15	4.68	43.78	1.31	0.36	4.04
April-15	1.21	8.11	79.74	1.35	0.74	8.05
May-15	1.18	4.71	47.32	1.27	0.85	9.06
June-15	1.24	4.57	48.78	1.34	0.98	10.98
July-15	1.13	5.81	56.06	1.24	0.93	9.80
August-15	1.06	5.90	52.53	1.17	0.60	5.77
September-15	1.10	3.91	37.54	1.22	0.43	4.34
October-15	1.08	4.20	37.92	1.19	0.50	4.91
November-15	1.20	2.87	28.86	1.32	0.61	6.48
December-15	1.39	3.80	45.27	1.52	0.30	3.93
Maximum	1.39	8.11	79.74	1.52	1.01	10.98
Minimum	1.06	2.87	28.86	1.17	0.30	3.93
Average	1.16	4.89	47.56	1.29	0.65	6.99

2015 Monthly Averages



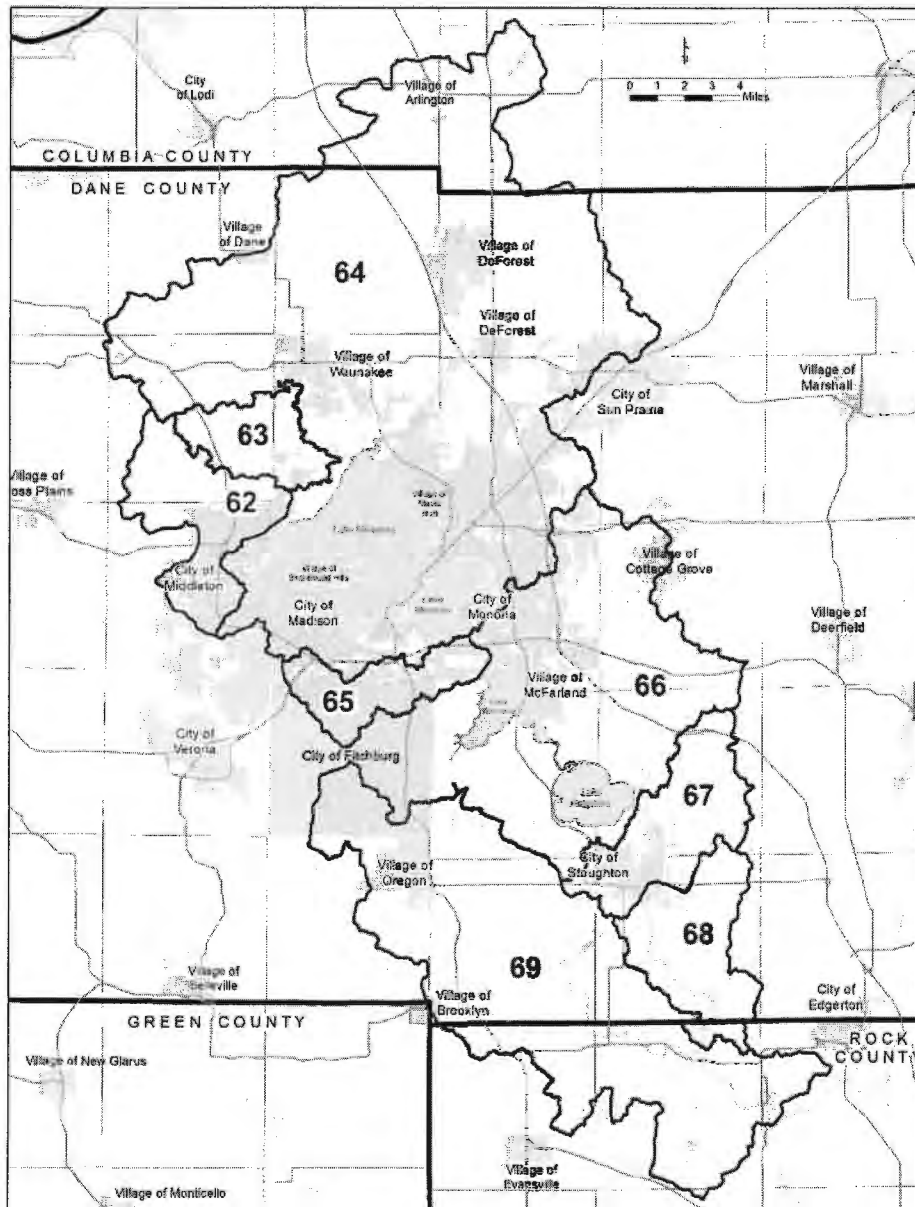
Village of Oregon
WWTP Phosphorus Data

2016 Monthly Averages	Influent Flow	Influent Total Phos	Influent Phos Loading (lb/day)	Effluent Flow	Effluent Total Phos	Effluent Phos Loading (lb/day)
	MGD	MG/L	LB/DAY	MGD	MG/L	LB/DAY
January-16	1.28	4.69	49.94	1.46	0.44	5.41
February-16	1.19	4.32	42.89	1.38	0.98	11.34
March-16	1.31	3.41	37.37	1.49	0.75	9.32
April-16	1.35	3.38	38.12	1.49	0.56	6.90
May-16	1.28	4.09	43.57	1.40	0.52	6.02
June-16	1.18	4.76	46.77	1.28	1.05	11.20
July-16	1.20	4.25	42.59	1.27	0.78	8.32
August-16	1.23	4.93	50.81	1.33	0.63	7.02
September-16	1.22	4.04	41.04	1.45	0.41	4.90
October-16	1.20	3.96	39.77	1.26	0.36	3.79
November-16	1.25	5.00	52.25	1.38	0.60	6.92
December-16	1.27	4.12	43.64	1.44	0.27	3.18
Maximum	1.35	5.00	52.25	1.49	1.05	11.34
Minimum	1.18	3.38	37.37	1.26	0.27	3.18
Average	1.25	4.25	44.06	1.39	0.61	7.03



Watershed Adaptive Management Request

Attachment A-Action Area Map



Yahara River Watershed With TMDL Stream Reaches Shown.

Watershed Adaptive Management Request

Attachment B-Anticipated Partners

Partner		
<i>Madison Metropolitan Sewerage District</i>		
<i>Oregon WWTP, Stoughton Utilities, Madison Gas & Electric, WDNR-Fish Hatchery</i>		
<u>Towns</u>	<u>Villages</u>	<u>Cities</u>
<i>Blooming Grove</i>	<i>Cottage Grove</i>	<i>Fitchburg</i>
<i>Bristol</i>	<i>Grove</i>	<i>Madison</i>
<i>Burke</i>	<i>DeForest</i>	<i>Middleton</i>
<i>Cottage Grove</i>	<i>Maple Bluff</i>	<i>Monona</i>
<i>Dunkirk</i>	<i>McFarland</i>	<i>Stoughton</i>
<i>Dunn</i>	<i>Shorewood</i>	<i>Sun Prairie</i>
<i>Middleton</i>	<i>Hills</i>	
<i>Pleasant Springs</i>	<i>Waunakee</i>	
<i>Westport</i>	<u><i>Others</i></u>	<i>UW-Madison</i>
<i>Windsor</i>		
<i>Dane County Land and Water Resources Department</i>		
<i>Columbia County Land and Water Department</i>		
<i>Rock County Land Conservation Department</i>		
<i>USGS</i>		
<i>Clean Lakes Alliance</i>		
<i>Clean Wisconsin</i>		
<i>Sand County Foundation</i>		
<i>Yahara Pride Farms</i>		
<i>Capital Area Regional Planning Commission</i>		
<i>"Friends" Groups-e.g. Friends of Pheasant Branch Conservancy</i>		
<i>River Alliance of Wisconsin</i>		
<i>Rock River Coalition</i>		
<i>USDA/NRCS</i>		
<i>Wisconsin Department of Agriculture, Trade and Consumer</i>		
<i>Yahara Lakes Association</i>		
<i>UW Extension</i>		
<i>WDNR</i>		
<i>Wisconsin Land and Water Conservation Ass.</i>		

Substantial Compliance Determination

Permittee Name: VILLAGE OF OREGON		Permit Number: 0020681-09-0
	Compliance?	Comments
Discharge Limits	Yes	No violations since permit was reissued.
Sampling/testing requirements	Yes	All samples taken as required.
Groundwater standards	NA	No groundwater requirements in current permit.
Reporting requirements	Yes	Only a few late reports. Not a chronic issue.
Compliance schedules	Yes	Phosphorus - First 2 reports were submitted on time and correctly. Cuurently participating in Yahara WINS Adaptive Management Project. Annual reports will be required as part of new permit. Language will have to reflect that Madison Met is submitting the Annual Reports for all participants. Mercury - Oregon had a Mercury variance during this permit term. They implemented SRMs and the effluent numbers have dropped below the final limit. It is anticapted that there will be no reasonable potential to exceed the limit. Language to continue SRMs should be included with a final report due at the end of the permit term summarizing data.
Management plan	NA	No required management plan.
Other:	Yes	OIC at Proper Grade Required: Advanced - A1, B, C, P, L & SS Held: Advanced - A1, B, C, P & L Additional certified operators on staff
Enforcement Considerations		
In substantial compliance?	<p>Yes</p> <p>Comments: After review of compliance schedule items, discharge monitoring reports and a site visit on 6/6/2016, the Village of Oregon has been found to be in substantial compliance with their current WPDES permit.</p> <p>Signature: Amy Garbe Date: 03/08/2017</p> <p>Concurrence: _____ Date: _____</p>	